SAMHSA-HRSA
Center for Integrated Health Solutions

Prioritizing Prevention and Health Promotion in Mental Health: The Key to Preventing Early Mortality?

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Disclosures

- Grant Funding:
  - NIMH
  - CDC
  - HRSA
  - AOA
  - New Hampshire Endowment for Health
- Consultant:
  - Substance Abuse and Mental Health Administration
  - National Association of State Mental Health Program Directors, National Council

Purpose & Overview

- Purpose:
  - To set the stage for discussions in San Diego on integrating effective health promotion and health behavior change interventions in service models

- Overview:
  - Causes of early mortality in serious mental illness
  - Determinants of health and premature morality in the general population and for persons with mental illness
  - Focus on obesity and smoking

The Epidemic of Premature Death in Older Persons with Serious Mental Illness

The average life expectancy in the US has steadily increased to 77.9 years (increasing by almost 5 years since the 90s alone)
At the same time…….

Mentally ill die 25 years earlier, on average

By Marilyn Elias, USA TODAY

Adults with serious mental illness treated in public systems die about 25 years earlier than Americans overall, a gap that's widened since the early '90s when major mental disorders cut life spans by 10 to 15 years, according to a report due Monday.

For people with serious mental illness:
The average life expectancy is 53 yrs.
"50 is the New 75"

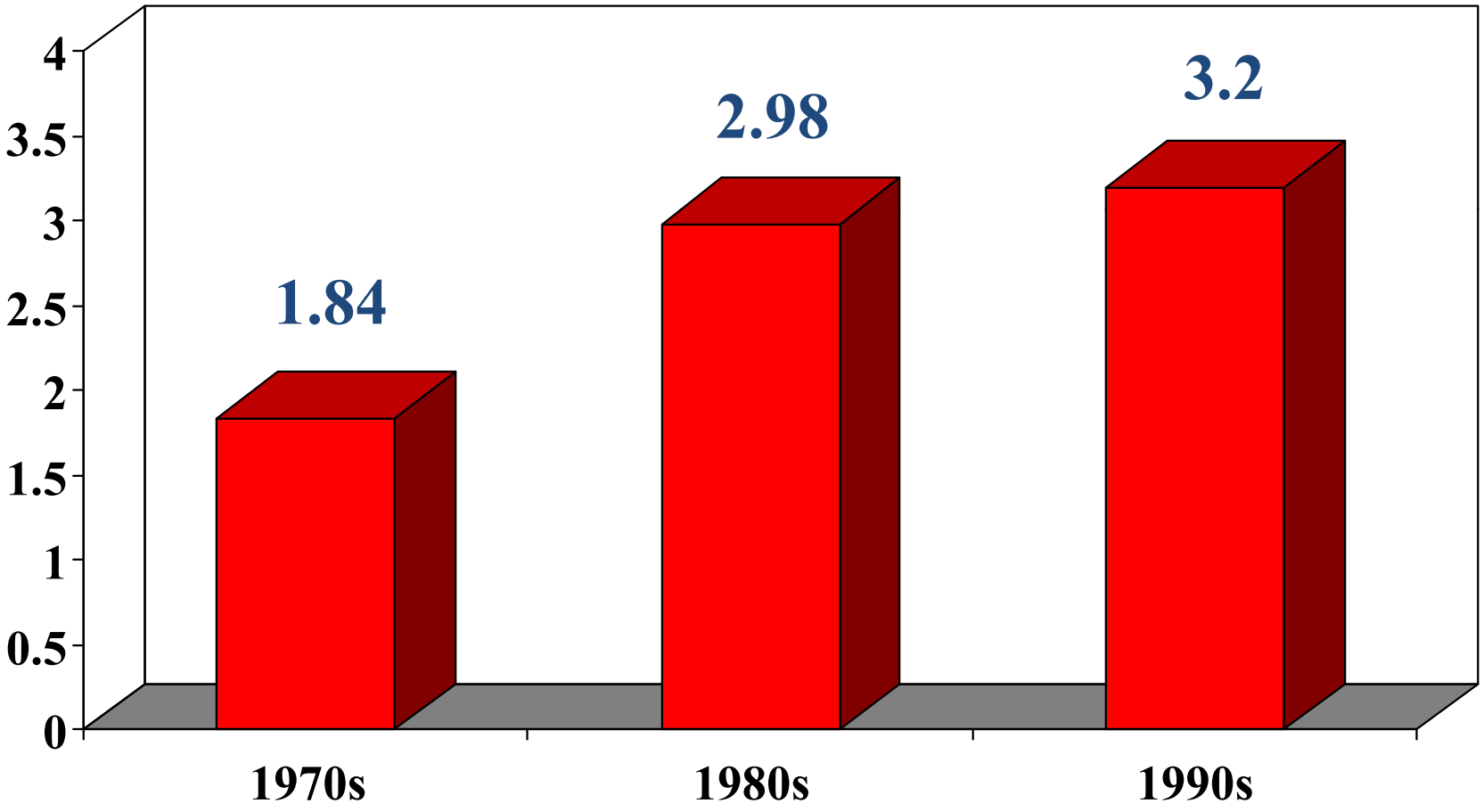
An "Epidemic" of Early Mortality: Mean Years of Potential Life Lost

Year	AZ	MO	OK	RI	TX	UT
1997		26.3	25.1		28.5	
1998		27.3	25.1		28.8	29.3
1999	32.2	26.8	26.3		29.3	26.9
2000	31.8	27.9		24.9		

Compared with the general population, persons with major mental illness lose 25-30 years of normal life span

Colton CW, Manderscheid RW. Prev Chronic Dis [serial online] 2006 Apr [date cited]. Available at: URL:http://www.cdc.gov/pcd/issues/2006/apr/05_0180.htm

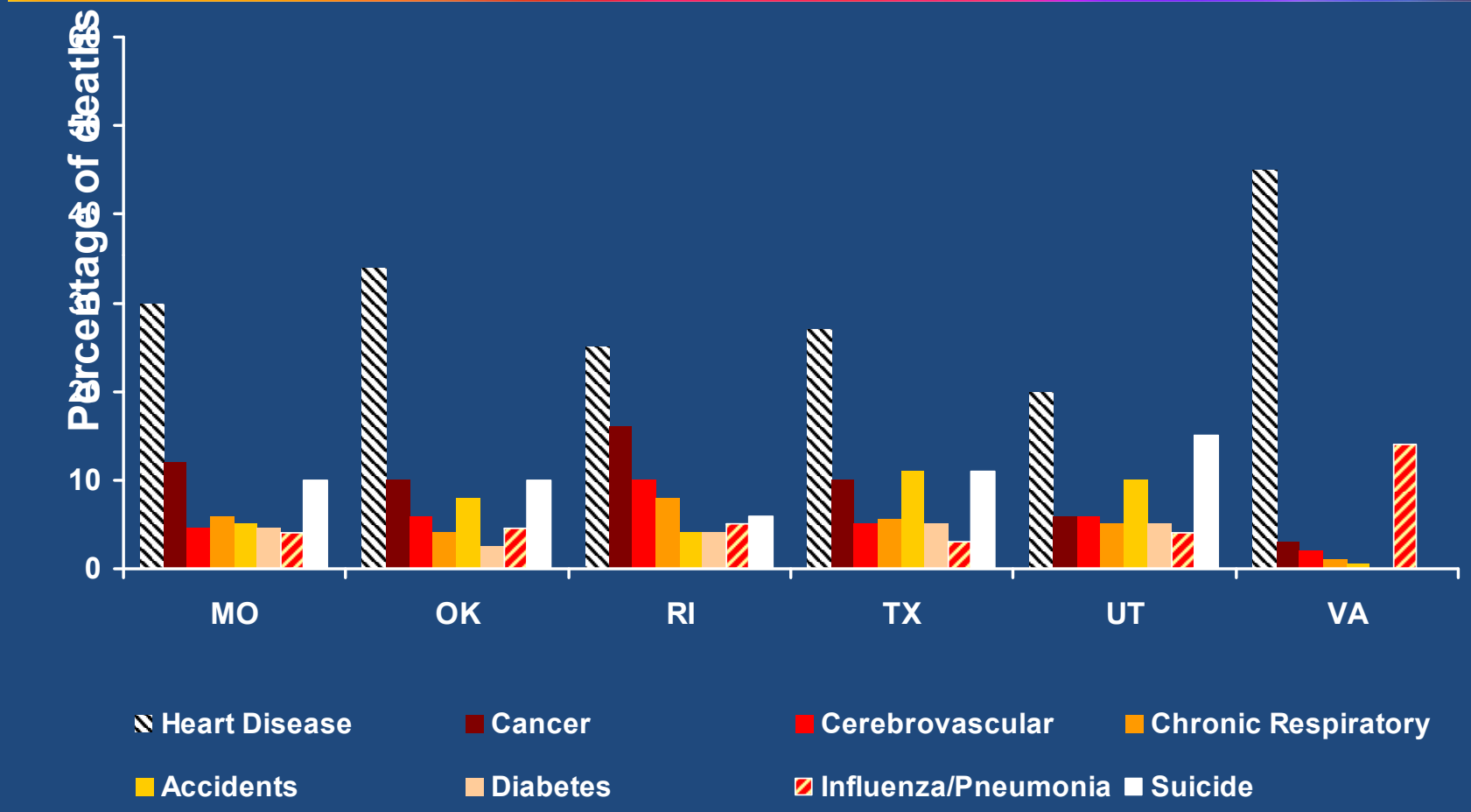
The Differential Mortality Gap for Schizophrenia Has Increased Over Recent Decades



P<.03

Saha, S. et al. Arch Gen Psychiatry 2007;64:1123-1131.

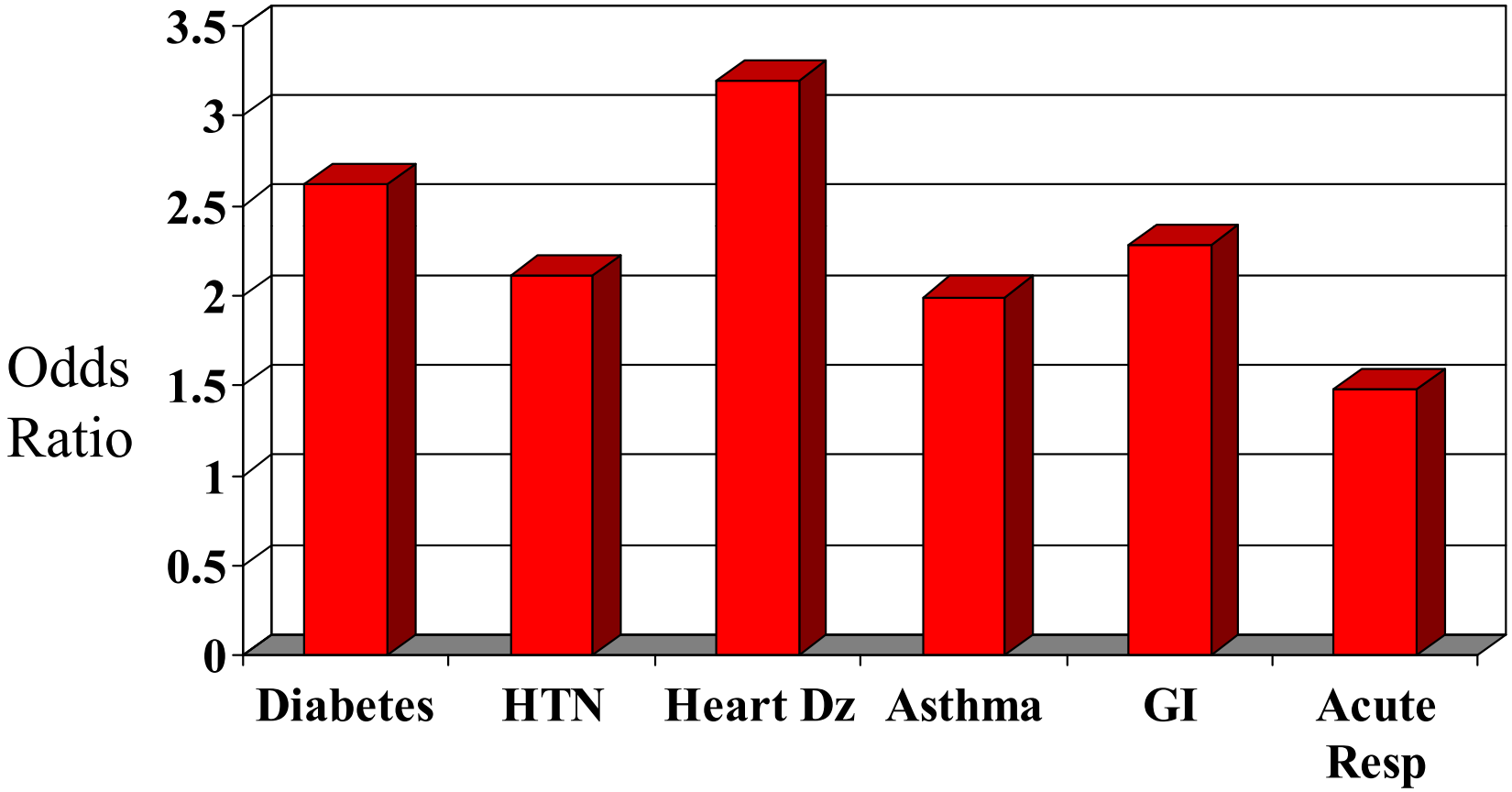
Cardiovascular Disease Is Primary Cause of Death in Persons with Mental Illness*



*Average data from 1996-2000.

Colton CW, Manderscheid RW. Prev Chronic Dis [serial online] 2006 Apr [date cited].
Available at URL: http://www.cdc.gov/pcd/issues/2006/apr/05_0180.htm

Increased Medical Comorbidity in Psychotic Disorders



All significant compared to non-psychosis groups

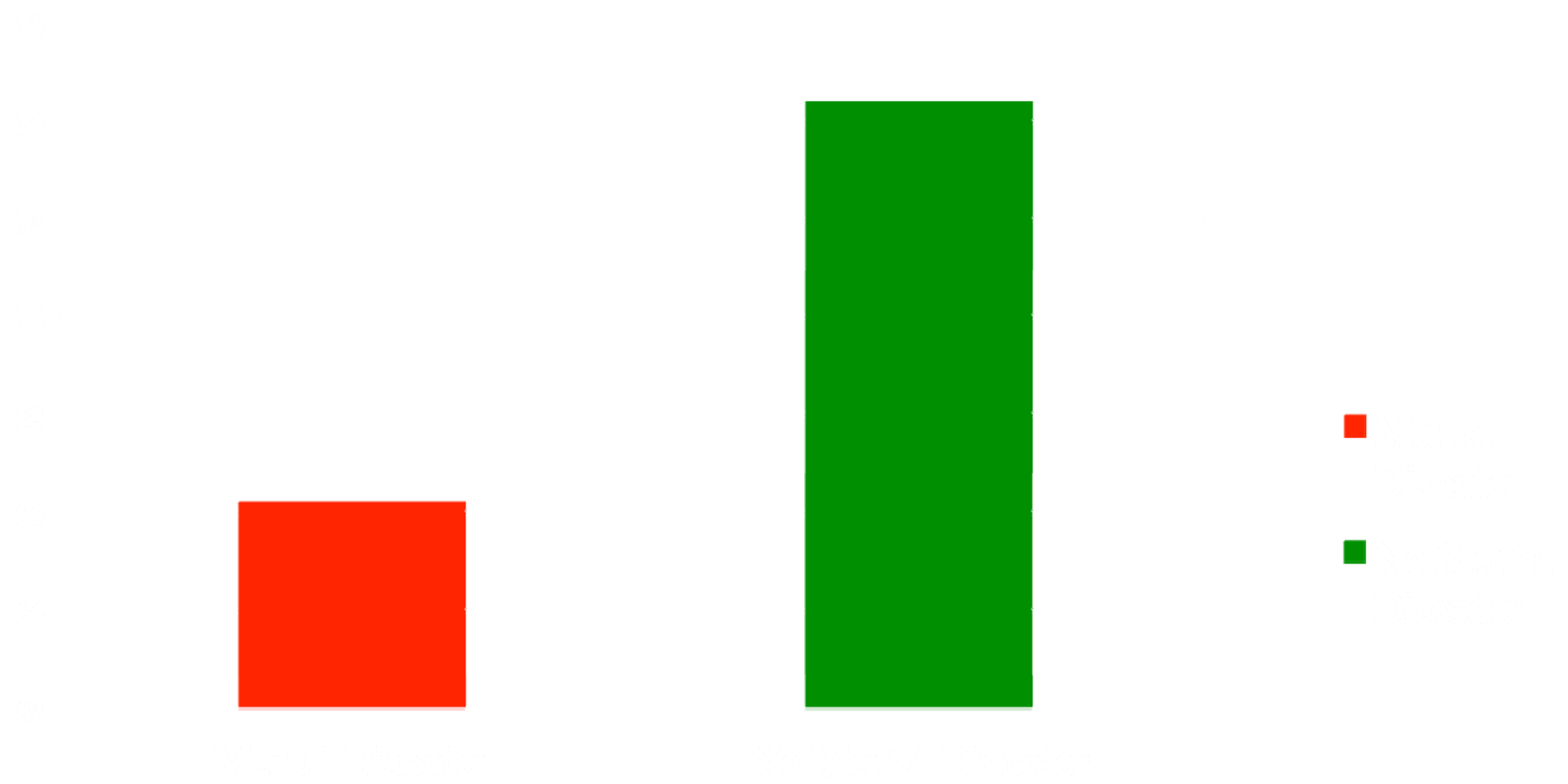
Dickey et al. , 2002, Psychiatric Services

What Accounts for Excess Morbidity and Mortality in Mental Disorders?

- 1989 Mental Health Supplement to the NHIS
- Mortality data collected for subsequent 17-18 years to assess
  - All-cause mortality
  - Relative contribution of
    - Socioeconomic factors
    - Health system factors
    - Clinical characteristics

Druss BG et al. Understanding Excess Mortality in Persons with Mental Illness: 17-Year Follow Up of a Nationally Representative US Survey. Medical Care, in press.

Age at Death



Druss BG et al. Understanding Excess Mortality in Persons with Mental Illness: 17-Year Follow Up of a Nationally Representative US Survey. Medical Care, in press.

Factors Contributing to Mortality for Persons with Mental Illness vs. the General Population

	Excess Hazard of Death (95% CI)	p value
Adjusted for demographics only	2.06 (1.77 – 2.40)	<0.001
Adding socioeconomics	1.77 (1.52 – 2.06)	<0.001
Adding health system factors	1.80 (1.54 – 2.11)	<0.001
Adding baseline clinical factors	1.32 (1.11 – 1.57)	<0.001
Adding all groups of factors	1.19 (1.00 – 1.42)	NS

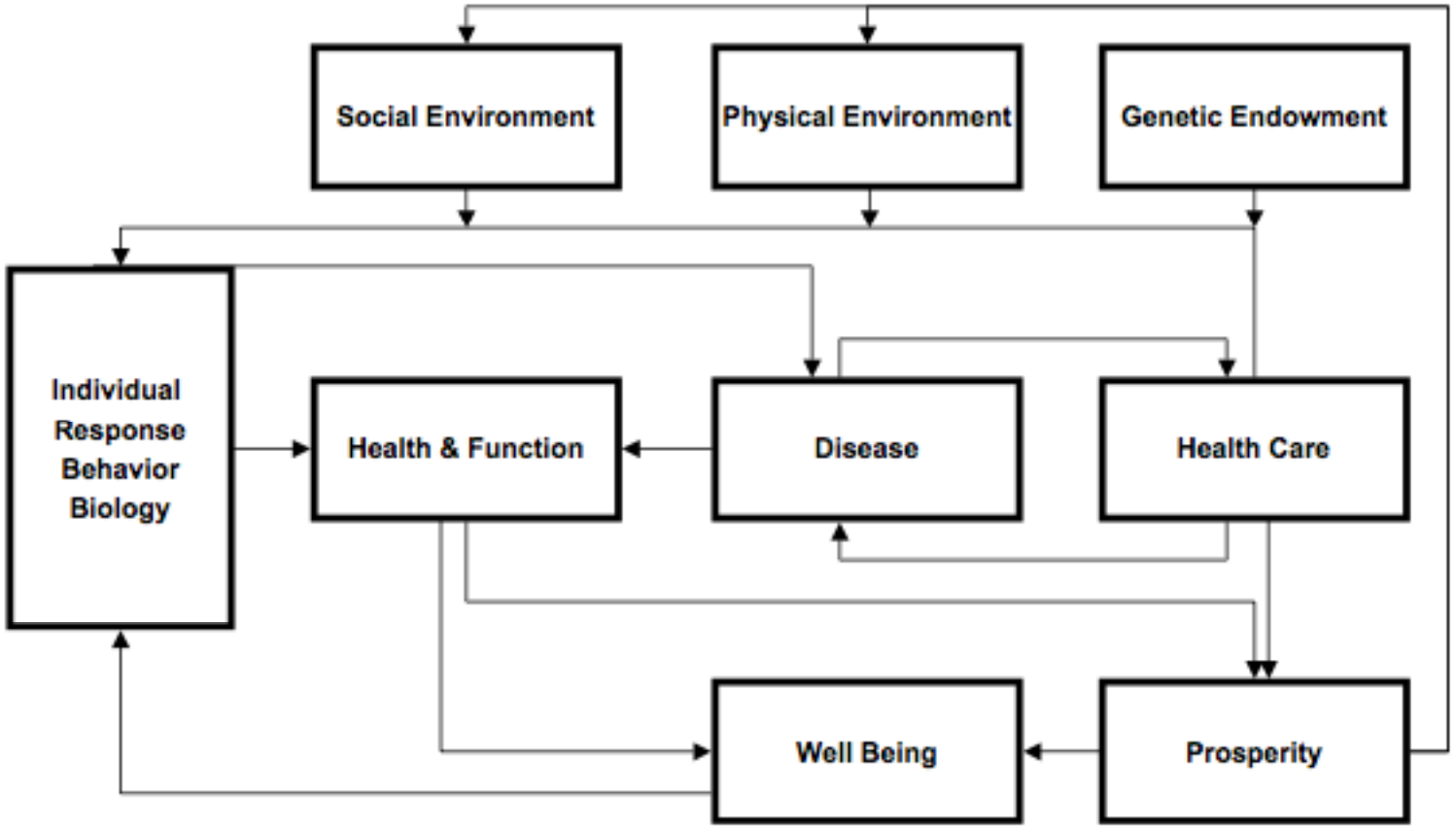
Druss BG et al. Understanding Excess Mortality in Persons with Mental Illness: 17-Year Follow Up of a Nationally Representative US Survey. Medical Care, in press.

Determinants of Health

- What Factors Account for Health?
- What Factors Account for Premature Mortality?

- How Much is Due to Health Care?
- How Much is Due to Other Factors
  - Genetics, Socioeconomic Factors, Environment, Health Behaviors, etc.

Determinants of Health



Source: Evans & Stoddart, Health Field Model, 1994

Selected Risk Factors Attributable to Premature Mortality Worldwide

Attributable Risk Factor	Percentage of Annual Deaths
High blood pressure	12.8%
Tobacco use	8.7%
High blood glucose	5.8%
Physical inactivity	5.5%
Overweight & obesity	4.8%
High cholesterol	4.5%
Total	*42.1%*

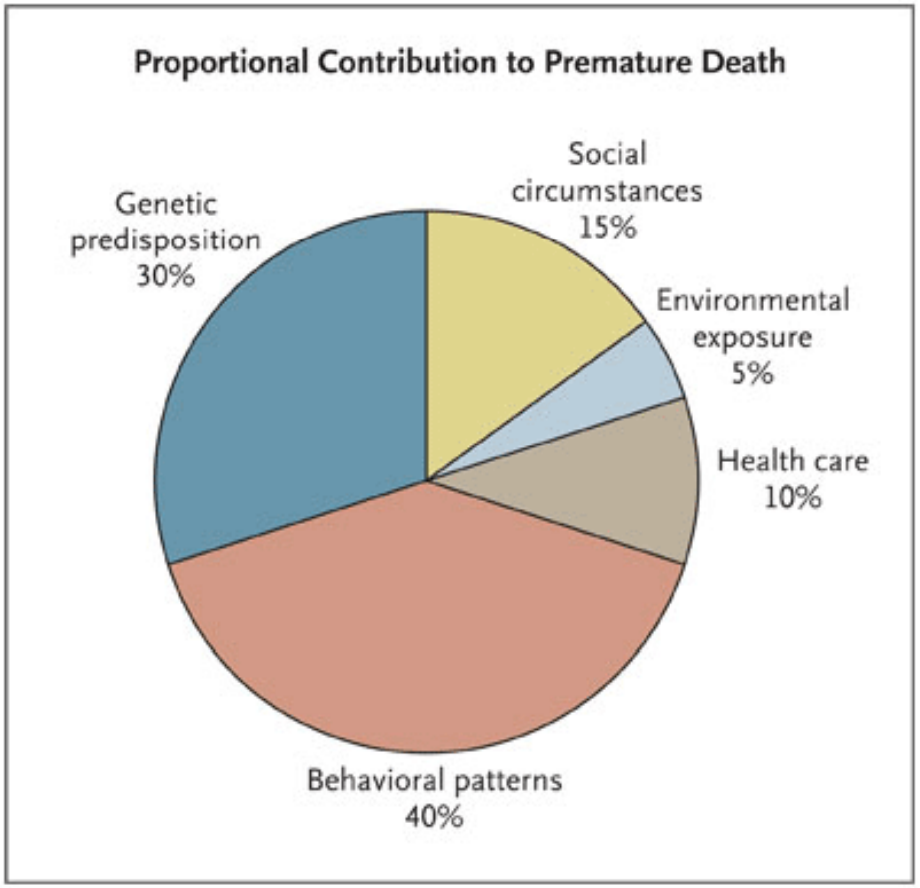
Source: World Health Organization (2009).

Cardiovascular Disease (CVD) Risk Factors

Modifiable Risk Factors	Estimated Prevalence and Relative Risk (RR)	
	Schizophrenia	Bipolar Disorder
Obesity	45–55%, 1.5-2X RR[1]	26%[5]
Smoking	50–80%, 2-3X RR[2]	55%[6]
Diabetes	10–14%, 2X RR[3]	10%[7]
Hypertension	≥18%[4]	15%[5]
Dyslipidemia	Up to 5X RR[8]	

1. Davidson S, et al. *Aust N Z J Psychiatry*. 2001;35:196-202. 2. Allison DB, et al. *J Clin Psychiatry*. 1999; 60:215-220.
3. Dixon L, et al. *J Nerv Ment Dis*. 1999;187:496-502. 4. Herran A, et al. *Schizophr Res*. 2000;41:373-381.
5. MeElroy SL, et al. *J Clin Psychiatry*. 2002;63:207-213. 6. Ucok A, et al. Psychiatry Clin Neurosci. 2004;58:434-437.
7. Cassidy F, et al. *Am J Psychiatry*. 1999;156:1417-1420. 8. Allebeck. Schizophr Bull. 1999;15(1)81-89.

Factors Contributing to Longevity vs. Premature Death in the General Population



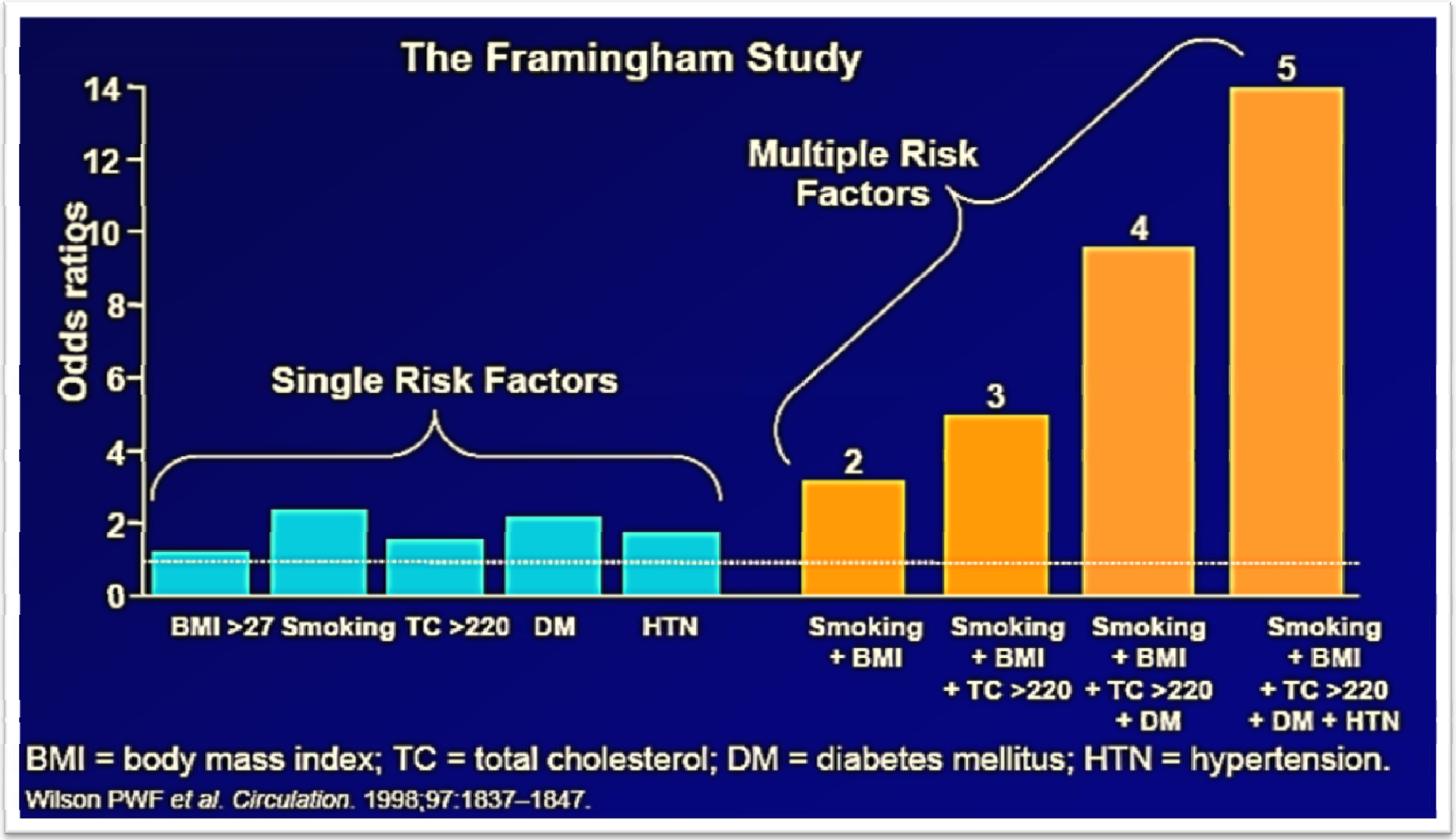
Source: N Engl J Med. 2007 Sep 20;357(12):1221-8.

Beneficial Effects of Interventions to Reduce Risks of CVD

- Maintenance of ideal body weight (BMI = 18.5-25)
  - 35%-55% ↓ in CHD
- Maintenance of active lifestyle (~30-min walk daily)
  - 35%-55% ↓ in CHD
- Cigarette smoking cessation
  - ~ 50% ↓ in CHD
- Blood cholesterol
  - 10% ↓ = 30% ↓ in CHD (200-180)
- High blood pressure (> 140 SBP or 90 DBP)
  - ~ 6 mm Hg ↓ = 16% ↓ in CHD; 42% ↓ in stroke

Hennekens CH. *Circulation* 1998;97:1095-1102.
Rich-Edwards JW, et al. *N Engl J Med* 1995;332:1758-1766.
Bassuk SS, Manson JE. *J Appl Physiol* 2005;99:1193-1204.

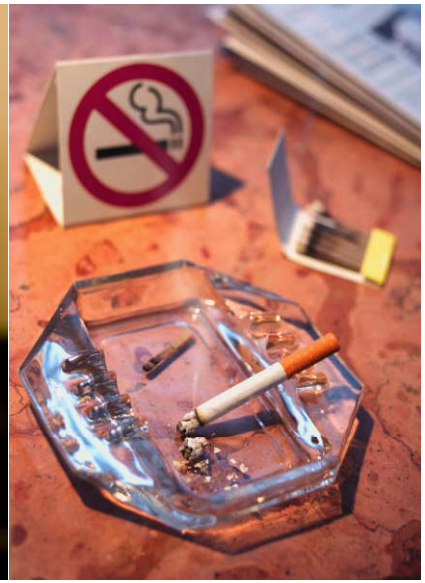
CVD Risk Factors Overview



Behavioral Risk Factors

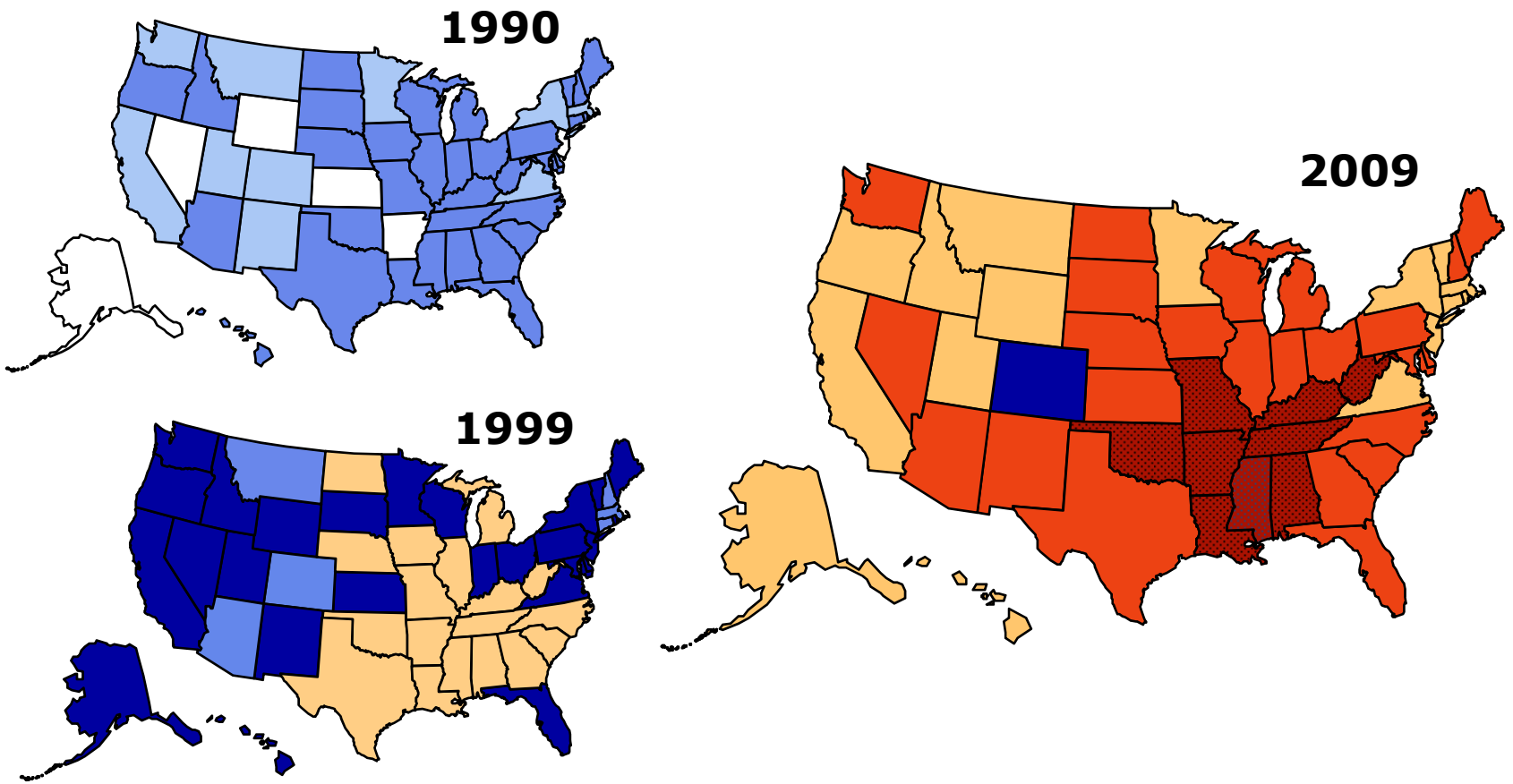
- Obesity: Diet & Physical Activity
- Smoking



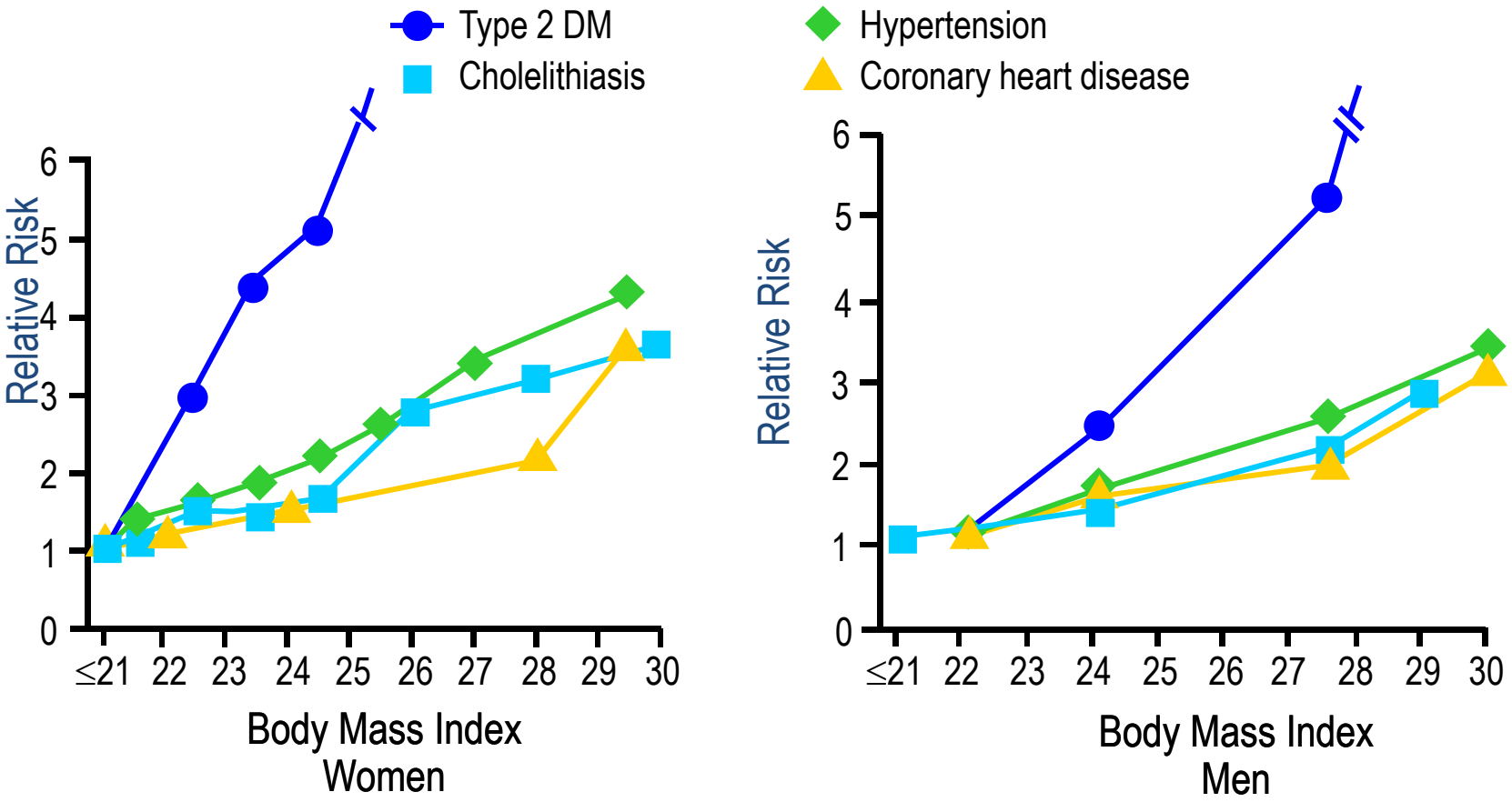


The Changing Health Risk of Americans
Obesity 1990, 1999, 2009

(*BMI ≥30, or about 30 lbs. overweight for 5'4" person)

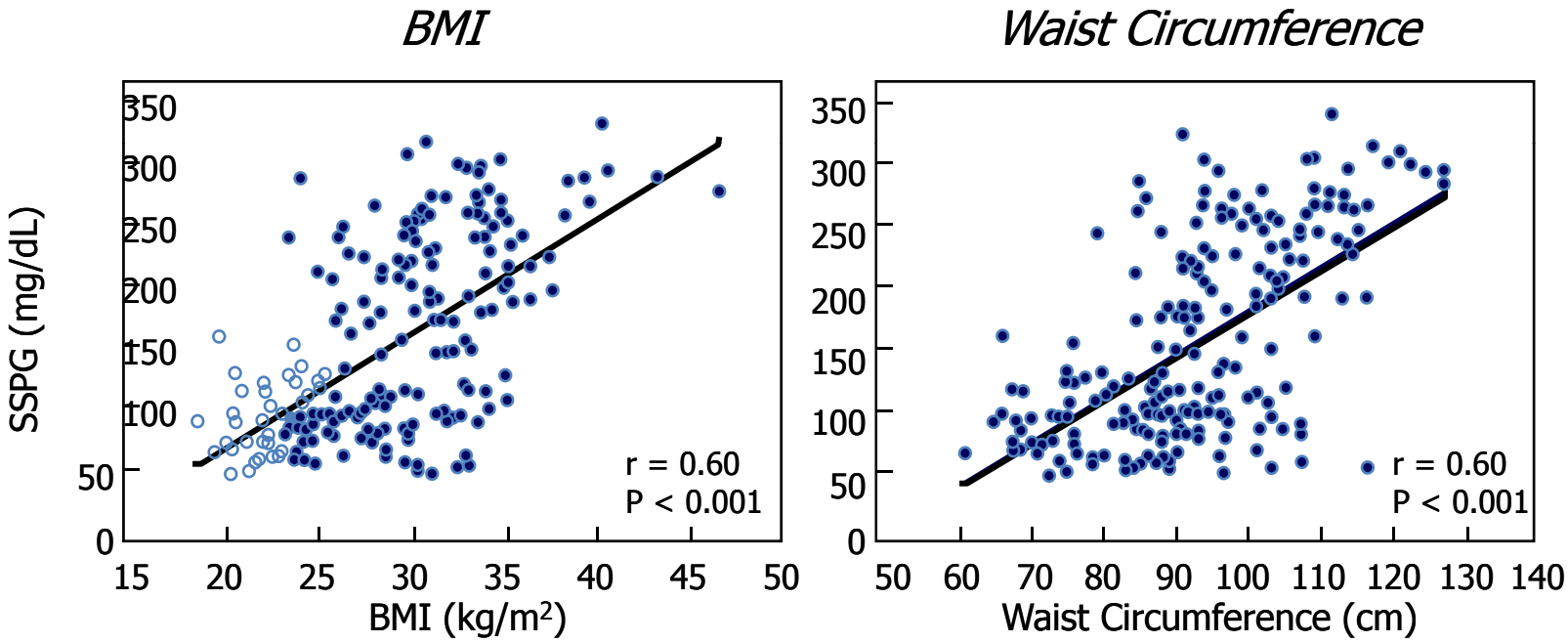


Adiposity and Medical Diseases



Willett WC, Dietz WH, Colditz GA N Engl J Med 1999 Aug 5;341(6):427-434

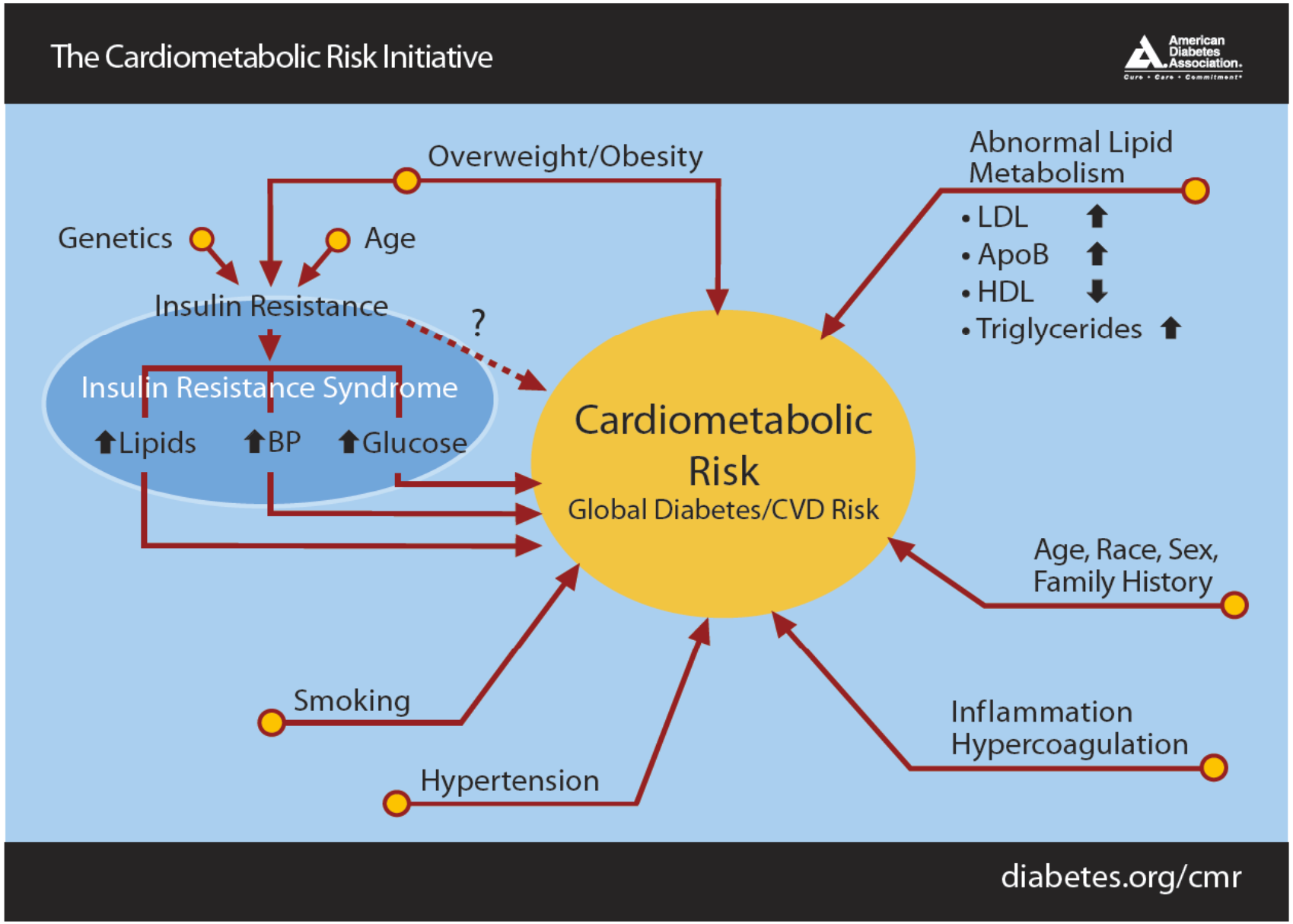
Relationship Between Insulin Resistance and either BMI or Waist Circumference



Insulin resistance measured using gold-standard steady state plasma glucose (SSPG) concentration during fixed-dose glucose and insulin infusions

Farin H, et al. *Metabolism* 2005;54:1323.

ADA Cardiometabolic Risk Initiative



Cardiovascular Disease

CVD accounted for over ¼ of deaths in the United States in 2007.

People with SMI have an increased risk of dying from CVD:

Multivariable results: Cox proportional HRs for mortality from HD (HD without pulmonary HD)

	Sociodemographic model (123,287 observations)	Adding clinical factors (123,287 observations)	Adding behavioral factors (117,892 observations)
Schizophrenia	1.37 (1.26–1.49)**	1.25 (1.15–1.36)**	1.17 (1.07–1.28)*
Bipolar disorder	1.24 (1.13–1.36)**	1.09 (0.99–1.20)	1.04 (0.94–1.14)
Other psychosis	1.89 (1.72–2.08)**	1.41 (1.27–1.55)**	1.30 (1.18–1.45)**
Major depressive disorder	1.26 (1.17–1.35)**	1.09 (1.01–1.17)*	1.04 (0.97–1.13)

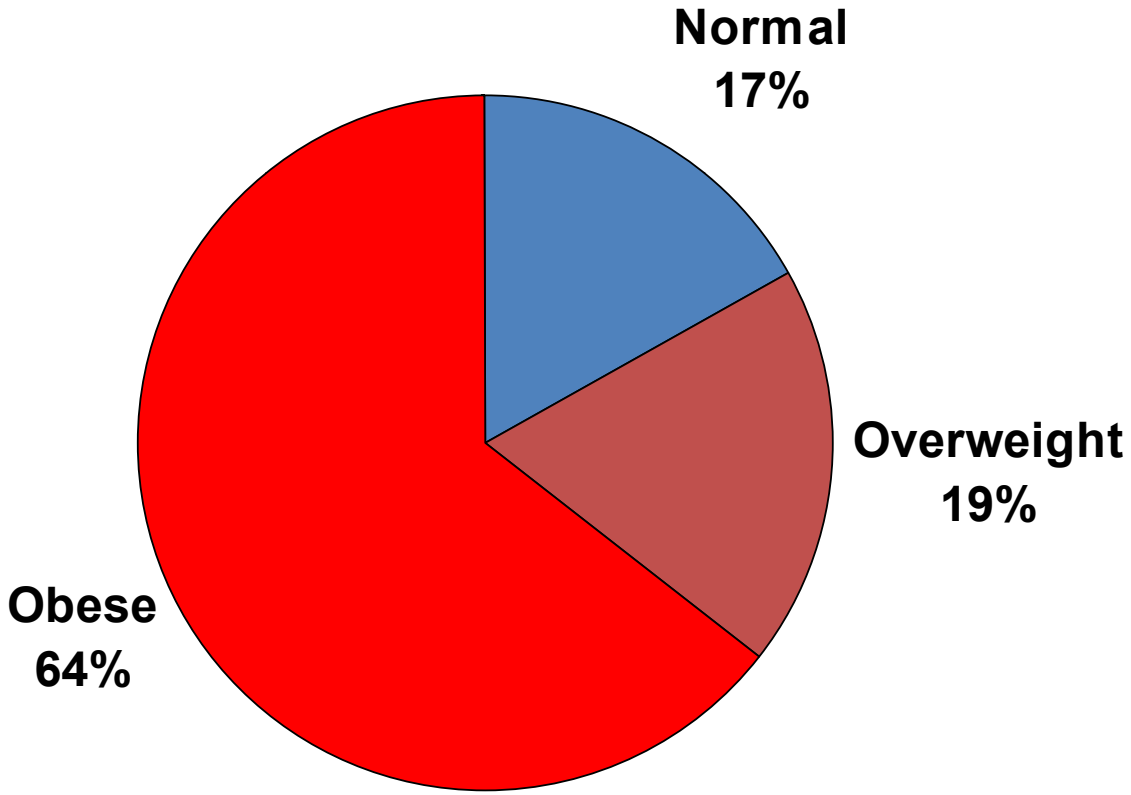
Source: Gen Hosp Psychiatry. 2009; 31: 555-563.

Obesity and Diabetes in the General Population vs. Persons with Serious Mental Illness

	General Population	Schizophrenia SMI
Obesity (BMI > 30)	27%[1]	40-62%[2]

Sources: 1. CDC (2009); 2. Perspect Psychiatr Care. 2008 Jan;44(1):25-31. 3. Schizophr Res. 2010 Aug;121(1-3):203-6.

Pilot Community Mental Health Center: Body Mass Index



Average weight = 204 pounds

Risk Factor: Poor Diet

Cohort Study of Dietary Intake of Persons with Schizophrenia versus General Population

Daily intake	Males			Females		
	Schizophrenia *N* (%)	Reference population *N* (%)		Schizophrenia *N* (%)	Reference population *N* (%)	
Fibre						
Low (⩽ 20 g)	22 (51)	1006 (28)	$\chi^2 = 15{\cdot}4$, df = 2,	21 (49)	1065 (36)	$\chi^2 = 4{\cdot}9$, df = 2,
Moderate (21–30 g)	15 (36)	1373 (38)	$P < 0{\cdot}001$	16 (37)	1621 (36)	$P = 0{\cdot}08$
High (> 30 g)	5 (13)	1263 (35)		6 (14)	1241 (28)	
Total fat						
Low (⩽ 83 g)	6 (19)	1113 (31)	$\chi^2 = 6{\cdot}9$, df = 2,	10 (23)	2176 (49)	$\chi^2 = 12{\cdot}4$, df = 2,
Moderate (84–122 g)	20 (47)	1343 (37)	$P = 0{\cdot}03$	20 (47)	1570 (35)	$P = 0{\cdot}002$
High (> 122 g)	16 (34)	1186 (33)		13 (30)	721 (16)	
Unsaturation of fat						
Low	7 (16)	419 (12)	$\chi^2 = 3{\cdot}3$, df = 2,	7 (16)	457 (10)	$\chi^2 = 3{\cdot}7$, df = 2,
Moderate	27 (65)	2087 (57)	$P = 0{\cdot}19$	28 (65)	2654 (59)	$P = 0{\cdot}16$
High	8 (19)	1136 (31)		8 (19)	1356 (30)	
Total	42	3642*		43	4467*	
Body Mass Index (kg/m²)						
Underweight (< 20)	2 (4)	(2)		3 (6)	(2)	
Desireable (21–25)	17 (35)	(29)	$\chi^2 = 2{\cdot}4$, df = 3,	11 (23)	(35)	$\chi^2 = 6{\cdot}48$, df = 3,
Overweight (26–30)	21 (42)	(52)	$P = 0{\cdot}50$	22 (47)	(39)	$P = 0{\cdot}09$
Obese (> 30)	9 (18)	(16)		11 (23)	(24)	
Total	49	1231†		47	1060†	

Source: Psychol Med. 1999 May;29(3):697-701.

Diet

- Schizophrenia associated with poor diet (McCreadie, et al. 1998) and as a result, are in need of specialized nutritional care (Gray & Gray, 1989).
- Reduced fruit and vegetable consumption for people with schizophrenia compared to a small age- and sex-matched control sample. (McCreadie et al (1998)

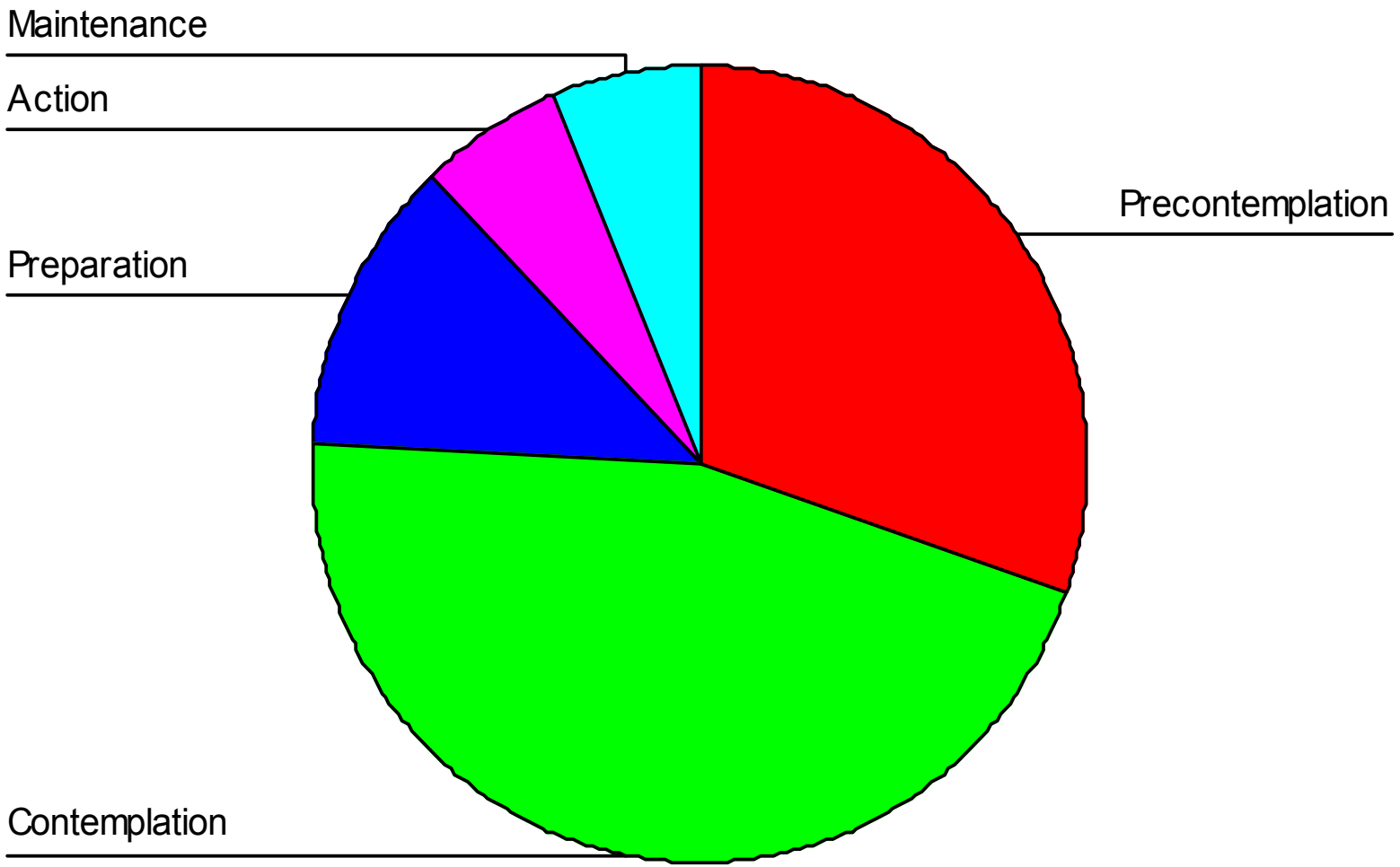
Scotland Study of Eating Habits of Persons with Schizophrenia

Dietary choice[1]	Men			Women		
	Patients (*n*=72) %	General population[2] (*n*=3941) %	*P*[3]	Patients (*n*=30) %	General population[2] (*n*=5106) %	*P*[3]
Fresh fruit once a day or more	33	46	0.04	43	59	0.12
Fruit juice once a day or more	17	26	0.09	20	32	0.23
Cooked green vegetables five times a week or more	10	39	<0.0001	27	44	0.08
Cooked root vegetables five times a week or more	1	22	<0.001	10	27	0.06
Raw vegetables or salad twice a week or more	25	45	0.001	40	59	0.05
Use skimmed or semi-skimmed milk	50	63	0.03	50	69	0.04
Oil-rich fish less than once a month	43	33	0.09	27	33	0.59
Potatoes, pasta or rice five or more times a week	25	64	<0.0001	30	69	<0.0001
Pulses two or more times a week	32	67	<0.0001	30	58	0.004
Breakfast cereal once a day or more	58	38	0.0007	50	38	0.25
Usually eat wholemeal bread	6	10	0.29	20	16	0.73

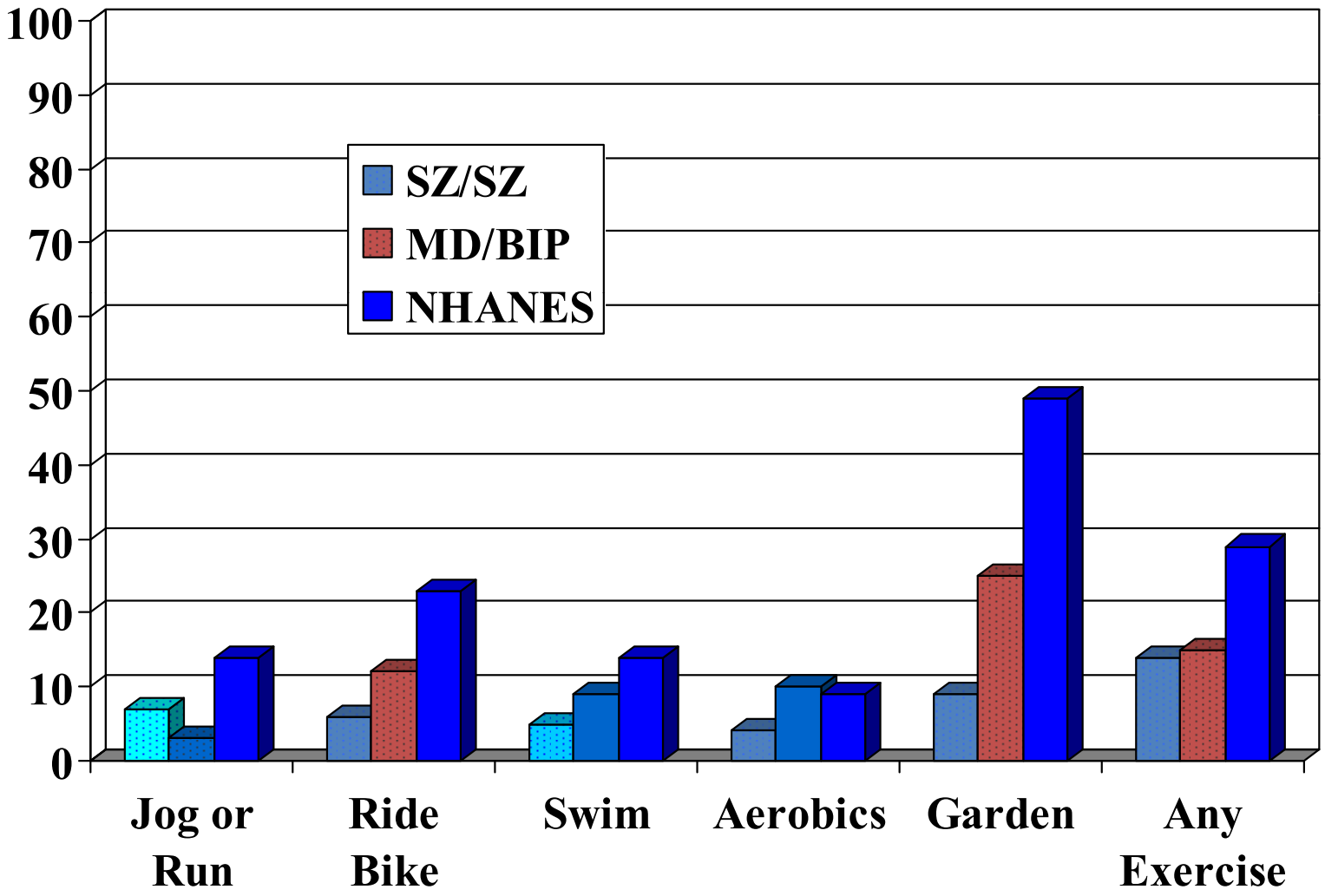
1. Scottish targets (Scottish Office Department of Health, 1996) are average intake of fruit and vegetables to double; average intake of fat (especially saturated) to reduce; oil-rich fish consumption to double; complex carbohydrate consumption to increase by 25%; bread intake, mainly wholemeal, to increase by 45%.
2. General population respondents interviewed in the Scottish Health Survey (Scottish Executive Health Department, 1998).

Source: BJ Psych. 2005; 187: 346-351.

Pilot Community Mental Health Center: Limit Amount Eaten



Exercise in Past Month



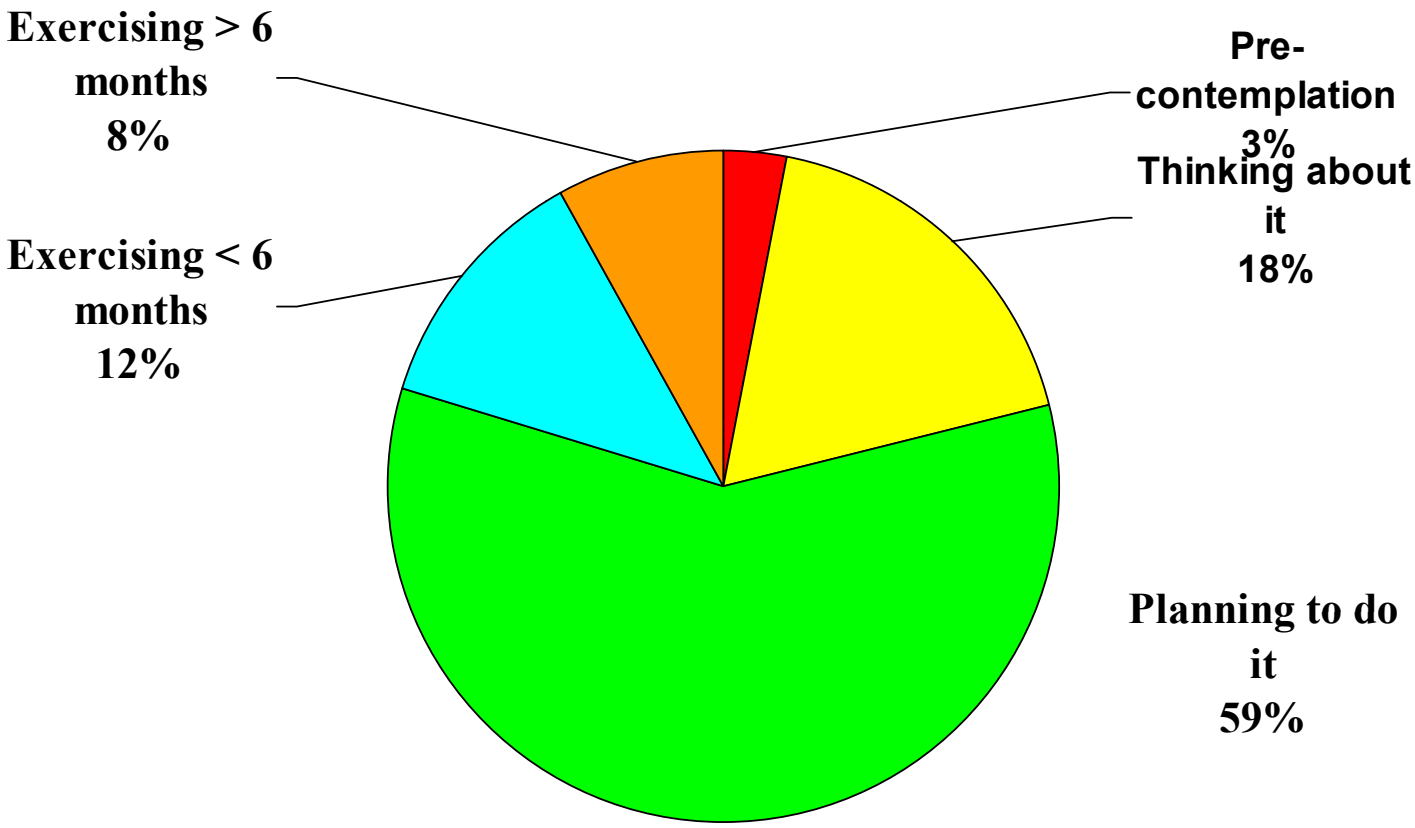
Physical Activity Trends:

Study of Community-Dwelling Adults with SMI, Ages 40+, Using Yale Physical Activity Scale

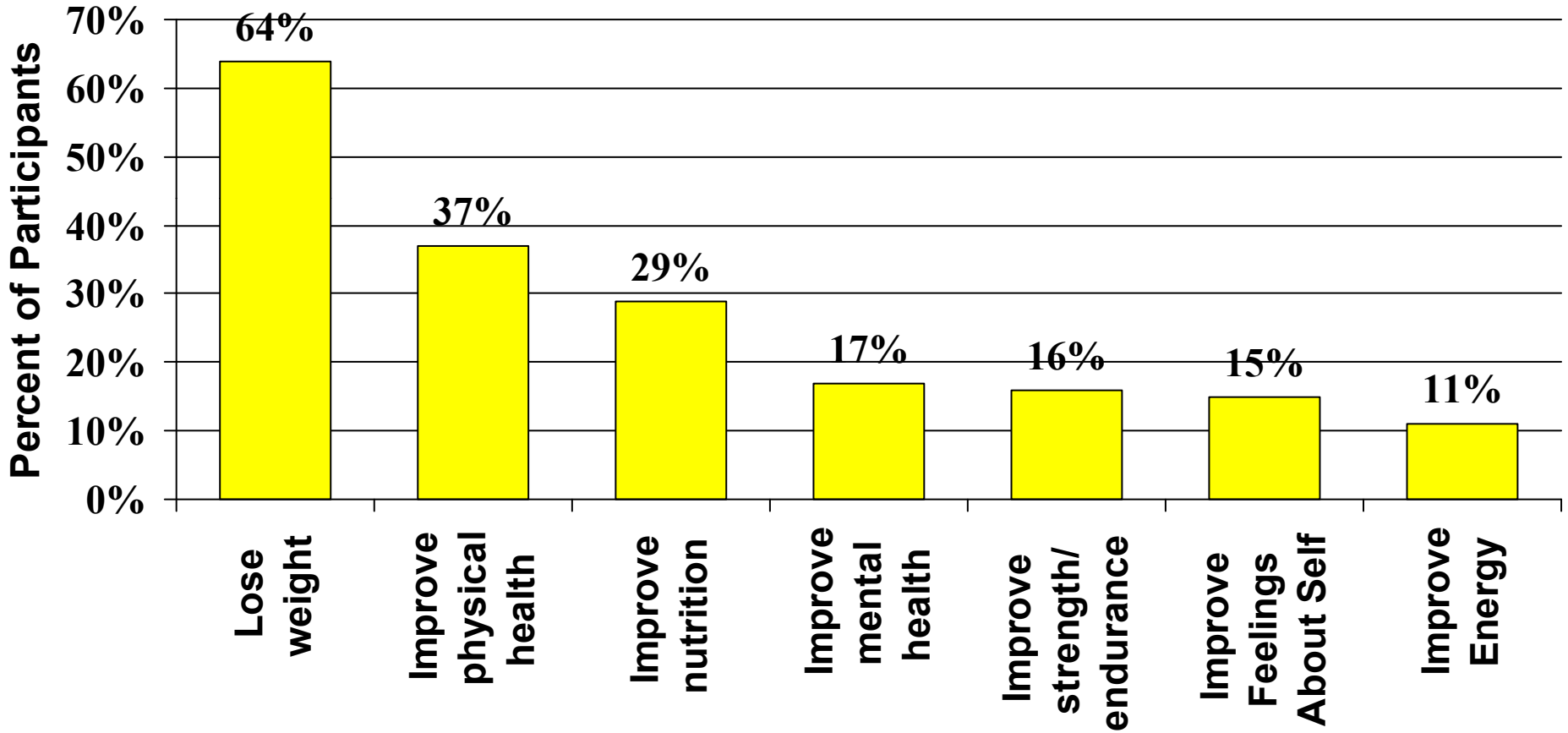
YPAS	Schizophrenia (n=54)	Comparison (n=27)	F-value	p-value
Time [a] (h/week)	11.2 (11.8)	32.5 (27.5)	36.00	.001
Energy [a] (kcal/week)	3174.2 (5072.9)	7968.6 (6886.3)	29.70	.001
Vigorous Activity Index [a]	10.2 (15.4)	22.4 (20.4)	10.76	.002
Leisurely Walking Index [a]	11.9 (11.1)	17.2 (14.2)	1.43	.235
Moving Index	6.2 (4.3)	9.1 (3.6)	9.59	.003
Standing Index [a]	3.0 (2.4)	5.3 (2.9)	11.75	.001
Sitting Index	2.5 (1.0)	2.3 (.86)	1.28	.261
Total Activity Index	34.2 (22.4)	56.2 (28.2)	14.58	.001

Source: Schizophr Res. 2008; 104: 294-301.

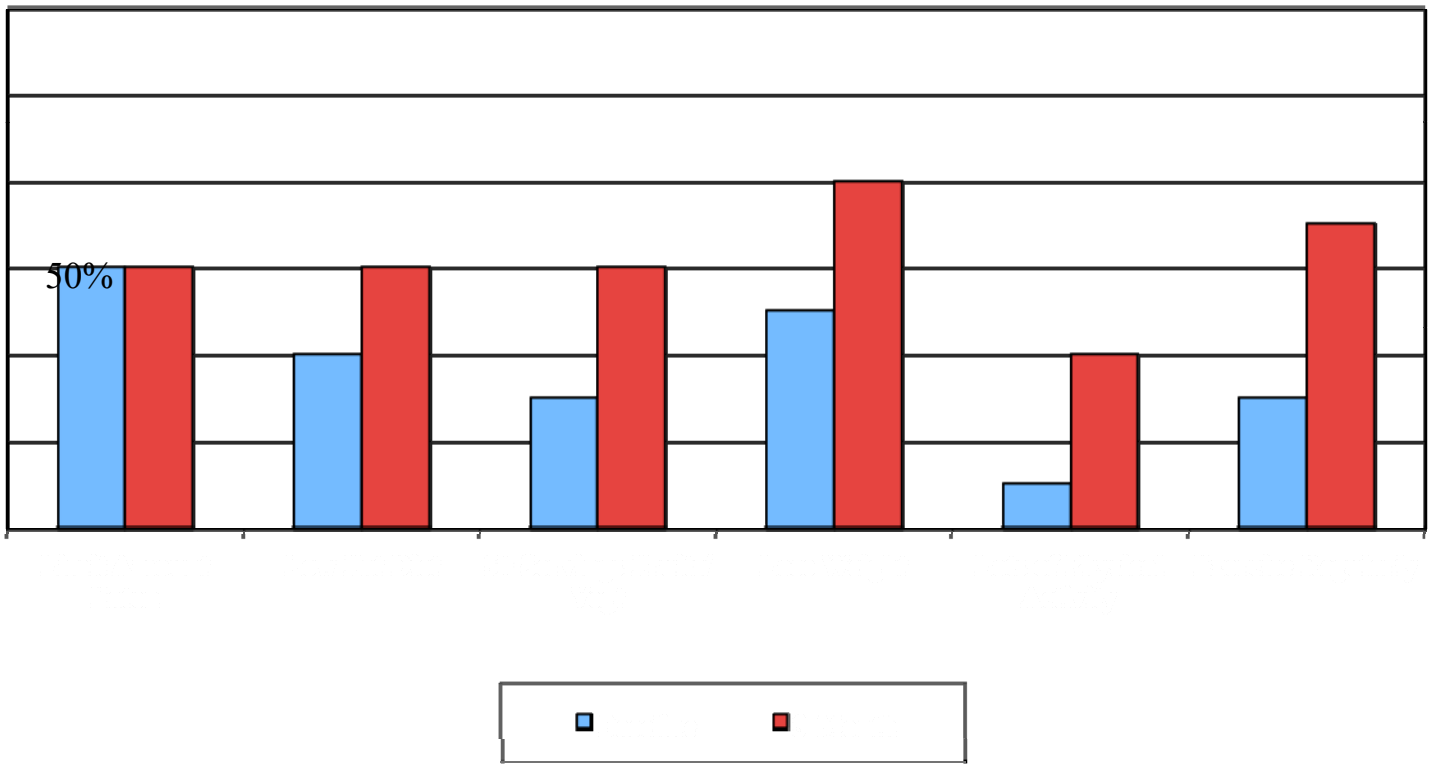
Pilot Community Mental Health Center: Do you Exercise Regularly?



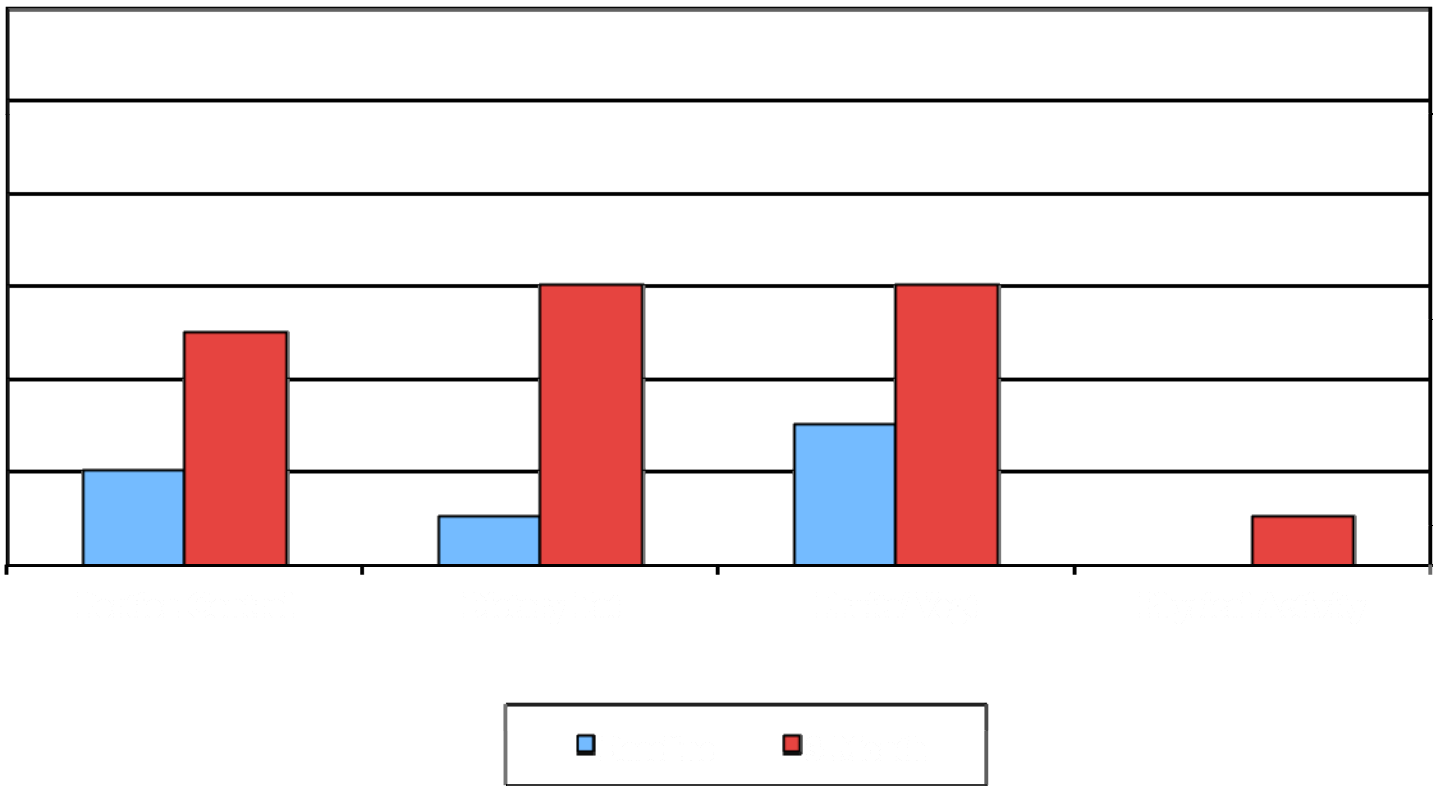
Consumer Reasons for Joining Fitness/Health Promotion Program



Persons in Action or Maintenance Stages (Baseline vs. 3 Month)



Persons in Action or Maintenance Stages (Baseline vs. 3 Month)

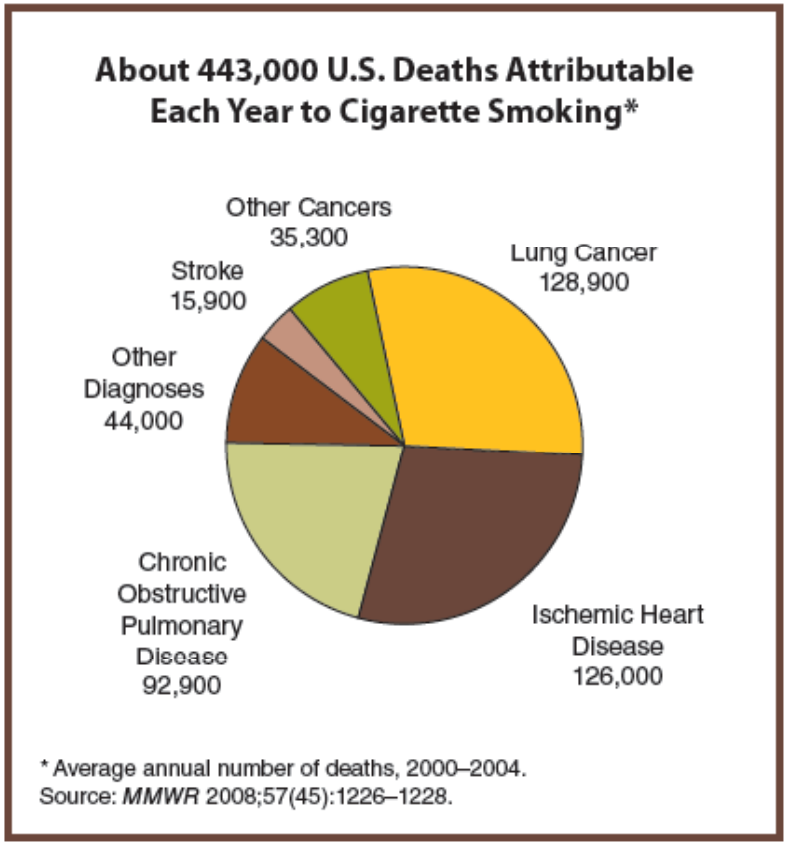


Risk Factor: Smoking

Smoking rates	
General population, U.S.[1]	21%
Persons with schizophrenia-related disorders[2]	55-75%

Sources: 1. CDC (2010). 2. Kelly, D.L., et al. (2009). Tran, E., et al. (2009). Williams, J.M. & Foulds, J. (2007). Am Heart J. 2005 Dec;150(6):1115-21.

Of all of the cigarettes smoked in the United States, 44% are smoked by people with a mental disorder.



Standardized Mortality Rates for Persons with Schizophrenia

Causes of death by disease category	SMR (95% CI) Schizophrenia (Harris and Barraclough, 1998) Systematic Review	SMR (10–90% Quantile) Schizophrenia (Saha et al., 2007) Systematic review	SMR (95% CI) Schizophrenia (Tran et al., 2009) Prospective Cohort study $n = 3470$, 11 yrs	SMR (95% CI) Schizophrenia (Brown et al., 2010) Prospective linkage study $n = 370$, 25 yrs
All-cause mortality	1.57 (1.53–1.60)	2.58 (1.18–5.76)	3.6 (3.3–3.9) males 4.3 (3.7–5.1) females	2.89 (2.47–3.37)
Circulatory	1.04 (1.00–108)	1.79 (1.10–3.60)	NOT GIVEN	2.58 (1.95–3.34)
Neoplasms	1.00 (0.95–1.06)	1.37 (0.71–2.40)	1.5 (1.20–1.90)	1.49 (1.00–2.12)
Respiratory	2.30 (2.13–2.48)	3.19 (2.20–9.30)	NOT GIVEN	4.99 (3.26–7.31)
Digestive	1.86 (1.64–2.09)	2.38 (1.79–17.5)	NOT GIVEN	2.89 (1.16–5.96)

Source: J. Psychopharmacol. 2010 Nov; 24(11): 37-50.

Smoking Mortality Rates, Persons with Schizophrenia

Variable	Hazard Ratio (95% Confidence Interval)
Male	1.42 (1.08–1.88)
Age: 19–34 y	0.47 (0.24–0.94)
Age: ≥55 y	6.81 (4.34–10.66)
Smoking (age: 19–34 y)	1.24 (0.57–2.70)
Smoking (age: 35–54 y)	2.06 (1.37–3.10)
Smoking (age: 55–69 y)	0.654 (0.42–0.99)

Source: Kelly, et al., Schizophr Bull. 2009 Dec 17 (Epub ahead of print).

Mortality Rates of Smokers, General Population

Causes of death by disease category	SMR (95% CI) Male cigarette smokers in the general population (Harris and Barraclough, 1998) Population = >18,450 Approximately 40 yrs
All-cause mortality	1.97 (1.92–2.02)
Circulatory	1.85 (1.79–1.91)
Neoplasms	2.21 (2.10–2.32)
Respiratory	2.97 (2.72–3.22)
Digestive	2.84 (2.24–3.57)

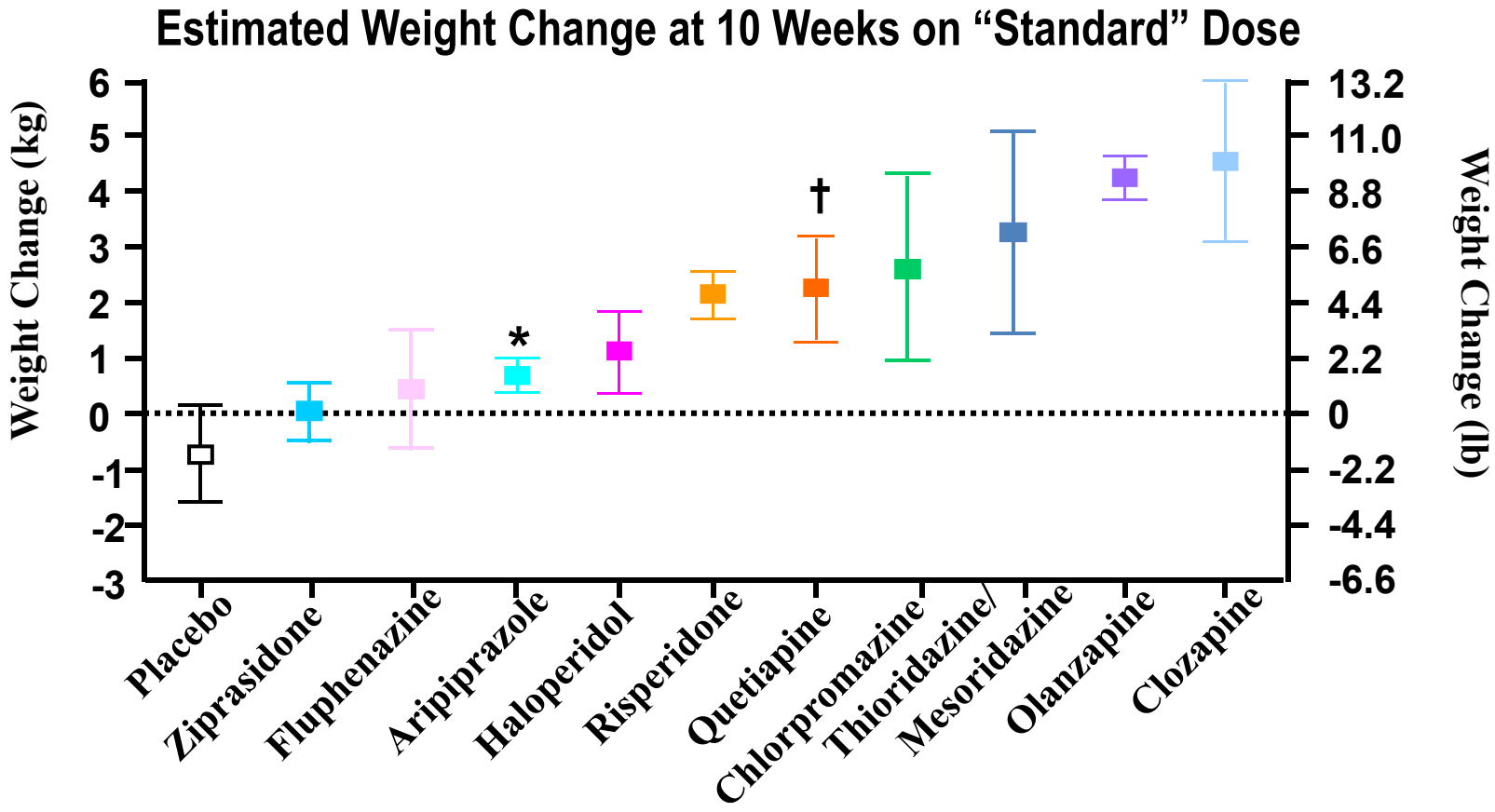
Source: J. Psychopharmacol. 2010 Nov; 24(11): 37-50.

Prevention focusing on Prescribing Behavior.

- The use of antipsychotic drugs have been linked to increased incidence of obesity, diabetes and hyperlipidemia in patients with SMI.

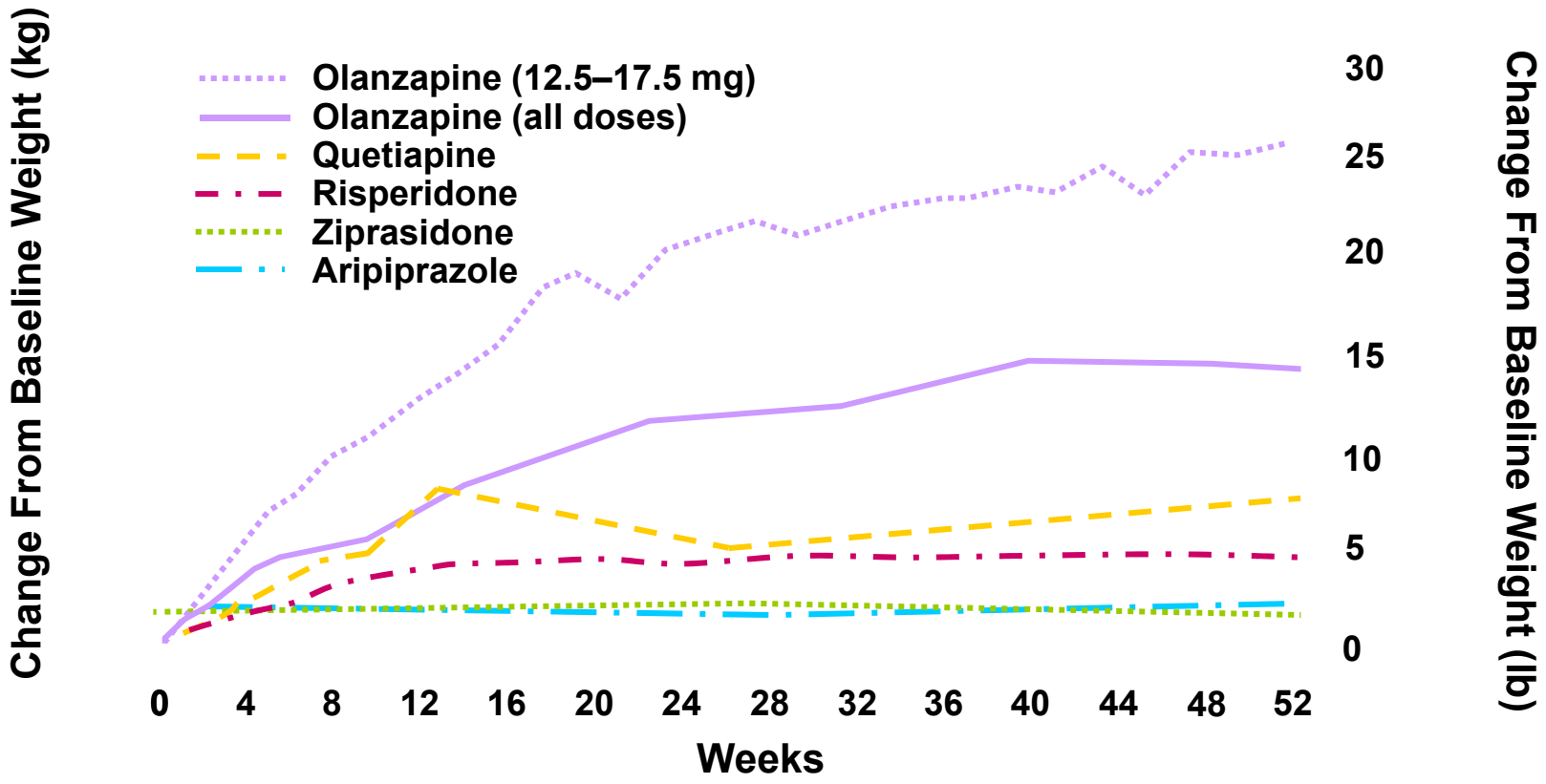
	Presently known level of risk for:		
Medication	**Weight gain**	**Diabetes**	**Hyperlipidemia**
Clozapine	Greatly increased	Slightly increased	Slightly increased
Olanzapine	Greatly increased	Slightly increased	Slightly increased
Risperidone	Moderately increased	Data inconclusive	Data inconclusive
Quetiapine	Moderately increased	Data inconclusive	Data inconclusive
Ziprasidone	Data inconclusive	No effect	No effect
Aripiprazole	Data inconclusive	No effect	No effect

Mean Change in Weight With Antipsychotics



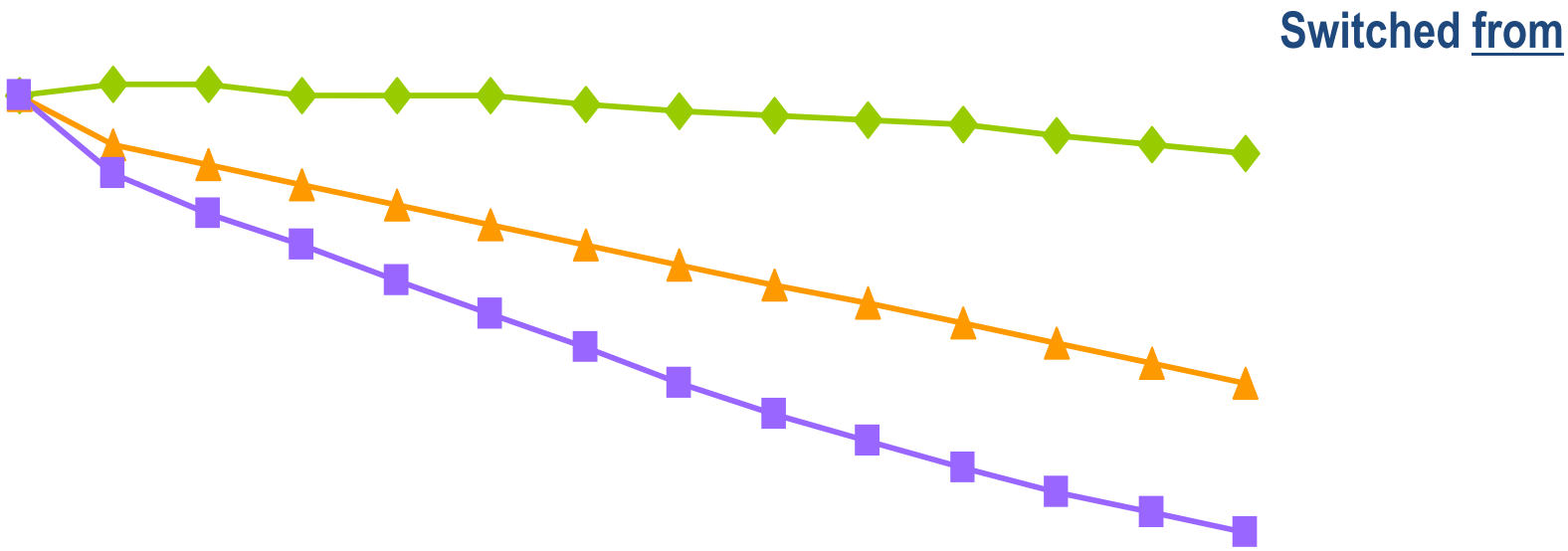
*4–6 week pooled data (Marder SR et al. *Schizophr Res*. 2003;1;61:123-36; †6-week data adapted from Allison DB, Mentore JL, Heo M, et al. *Am J Psychiatry*. 1999;156:1686-1696; Jones AM et al. ACNP; 1999.

1-Year Weight Gain: Mean Change From Baseline Weight



Nemeroff CB. *J Clin Psychiatry.* 1997;58(suppl 10):45-49; Kinon BJ et al. *J Clin Psychiatry*. 2001;62:92-100; Brecher M et al. American College of Neuropsychopharmacology; 2004. Poster 114; Brecher M et al. *Neuropsychopharmacology*. 2004;29(suppl 1):S109; Geodon® [package insert]. New York, NY:Pfizer Inc; 2005. Risperdal® [package insert]. Titusville, NJ: Janssen Pharmaceutica Products, LP; 2003; Abilify® [package insert]. Princeton NJ: Bristol-Myers Squibb Company and Rockville, Md: Otsuka America Pharmaceutical, Inc.; 2005.

Weight loss with switch to ziprasidone



Weiden PJ, Daniel DG, Murray S, Dunn J, Warrington L, Loebel A. Sustained metabolic and EPS benefits after switching to ziprasidone. Poster presented at: APA Annual Meeting, New York, May 2004.

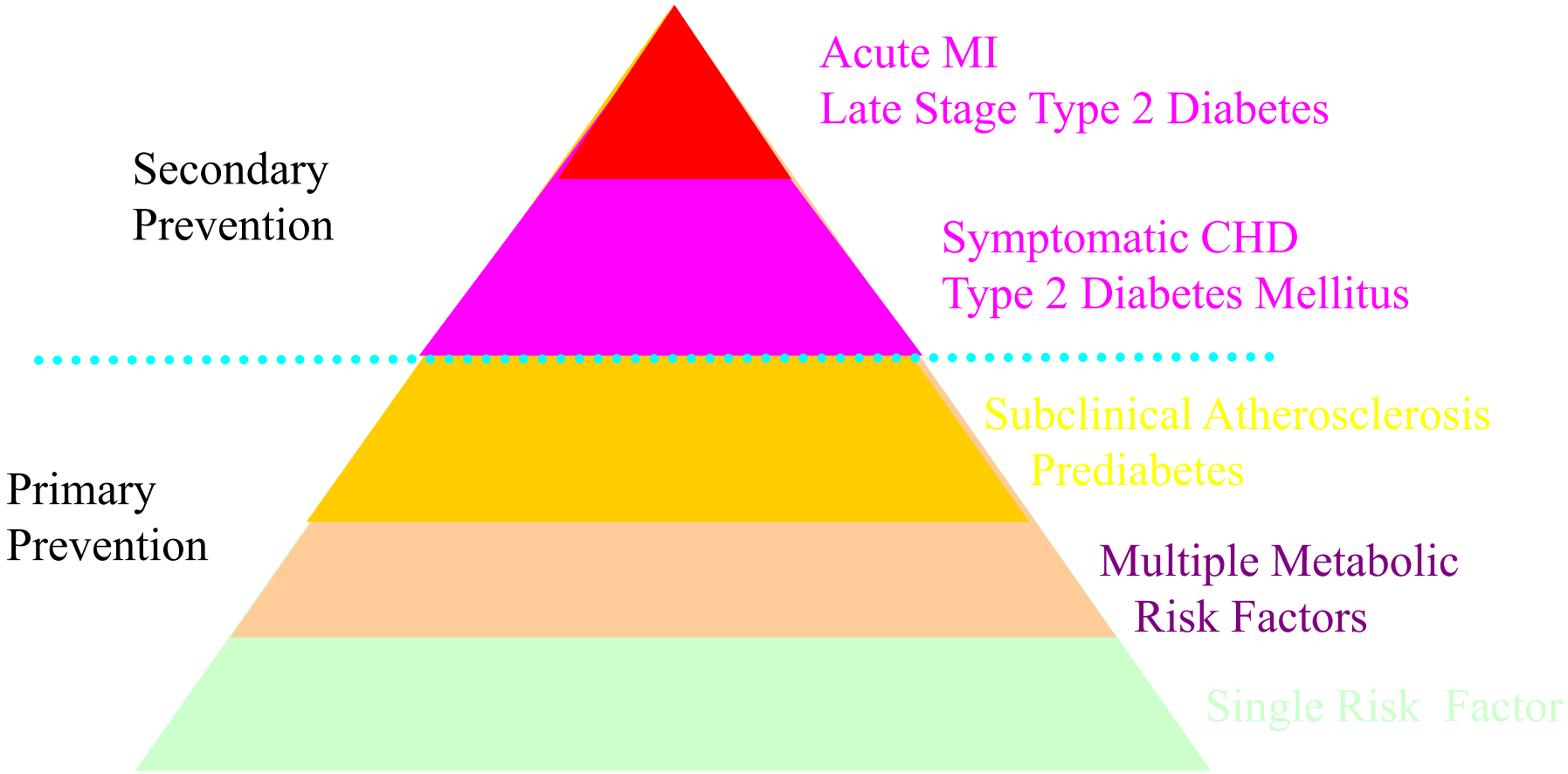
ADA Consensus on Antipsychotic Drugs and Obesity and Diabetes: Monitoring Protocol*

	Start	4 wks	8 wks	12 wks	3 mos.	12 mos.	5 yrs.
Personal/family Hx	X					X	
Weight (BMI)	X	X	X	X	X		
Waist circumference	X					X	
Blood pressure	X			X		X	
Fasting glucose	X			X		X	
Fasting lipid profile	X			X		X ←	X

**More frequent assessments may be warranted based on clinical status*

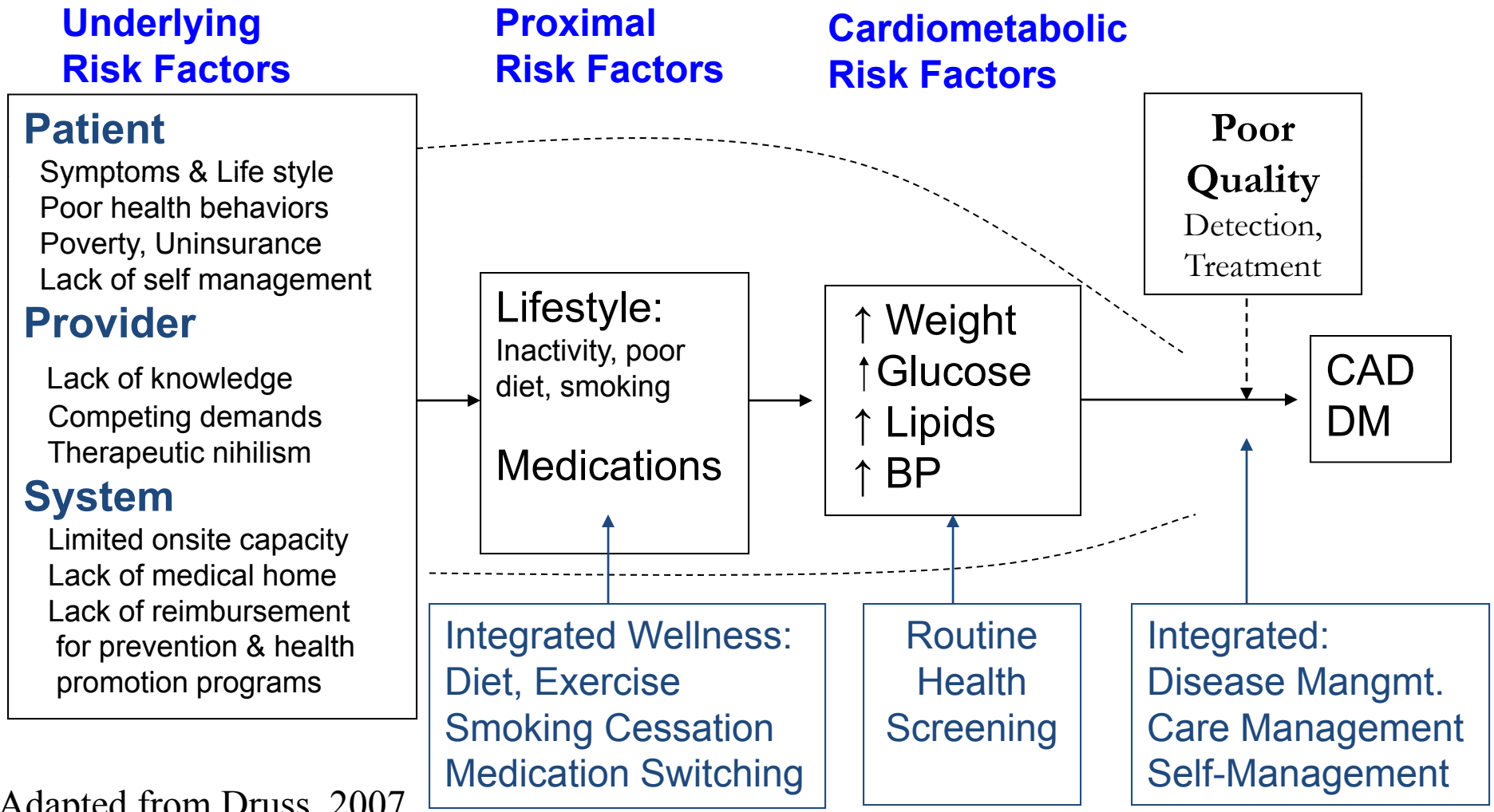
Diabetes Care. 27:596-601, 2004

Opportunities for Prevention:
Differential impact of primary versus secondary prevention



Grundy SM et al. *Circulation.* 1998;97:1876-1887.

The Big Picture: Reversing Early Mortality in Persons with Mental Illness



Adapted from Druss, 2007

In Summary

40% of premature mortality is estimated to be due to health behaviors in the general population
(vs. 10% association with health care)

People with SMI have substantially greater early mortality and health behavior risk factors

To prevent early mortality, improving *health behaviors* may be even *more* important than improving *health care delivery (though it is probably harder!)*

See you in San Diego…